



# Physics-Based Inversion of High-Frequency Multibeam Sonar Data

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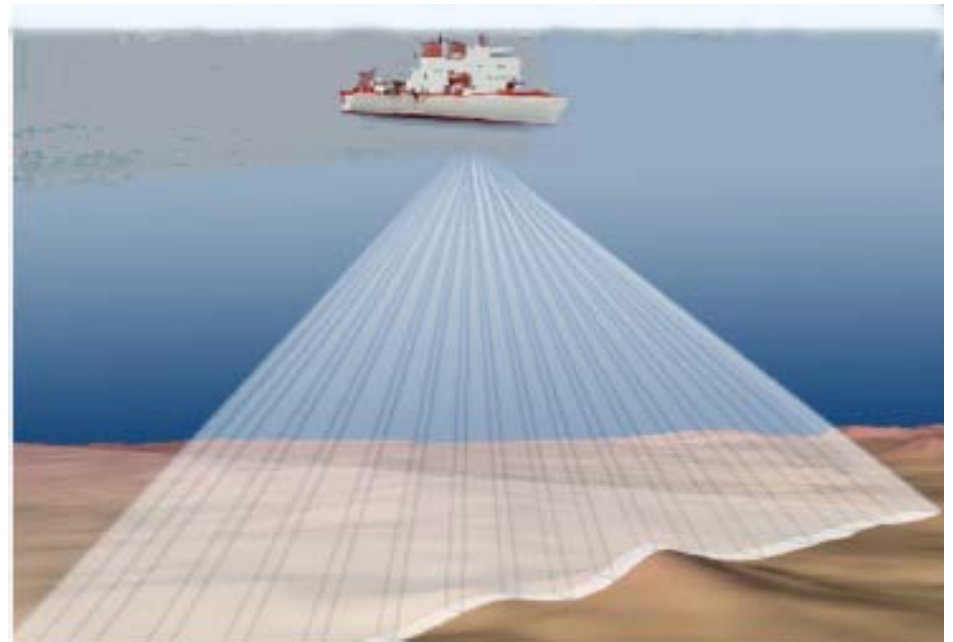
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Multibeam sonar supplied by Reson, Inc.*

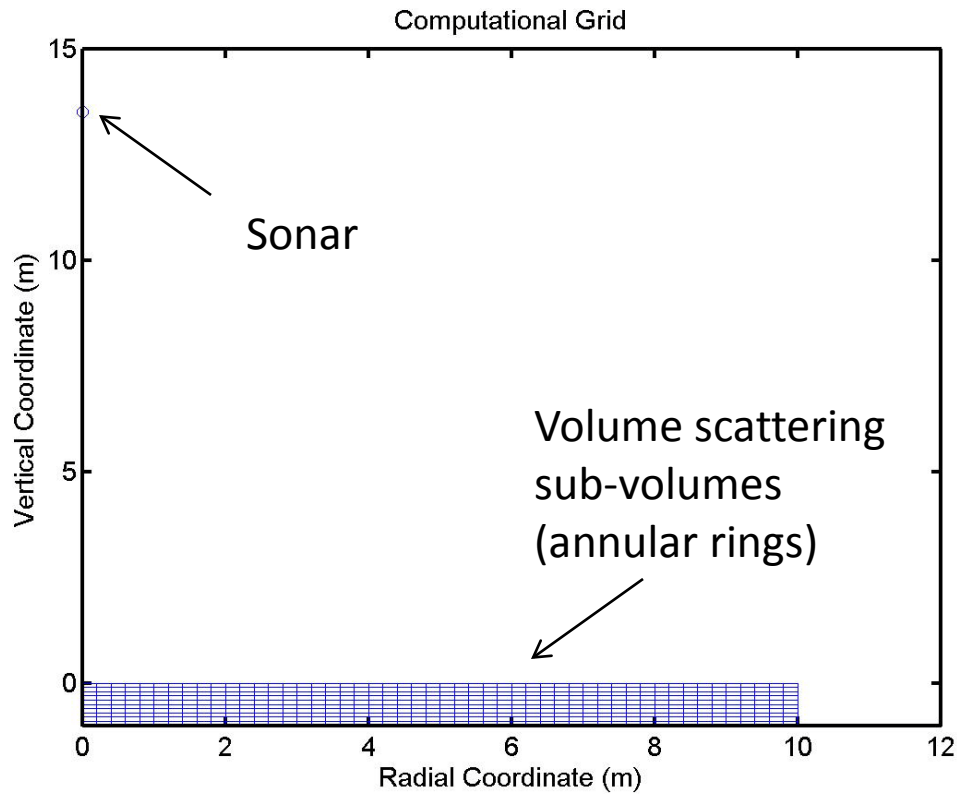


# Problem Statement

- Exploit improved multi-beam bathymetric sonar technology for seafloor characterization.
- Narrow beams allow better separation of roughness and volume scattering.
- Narrow beams cause greater sensitivity to ship motion.

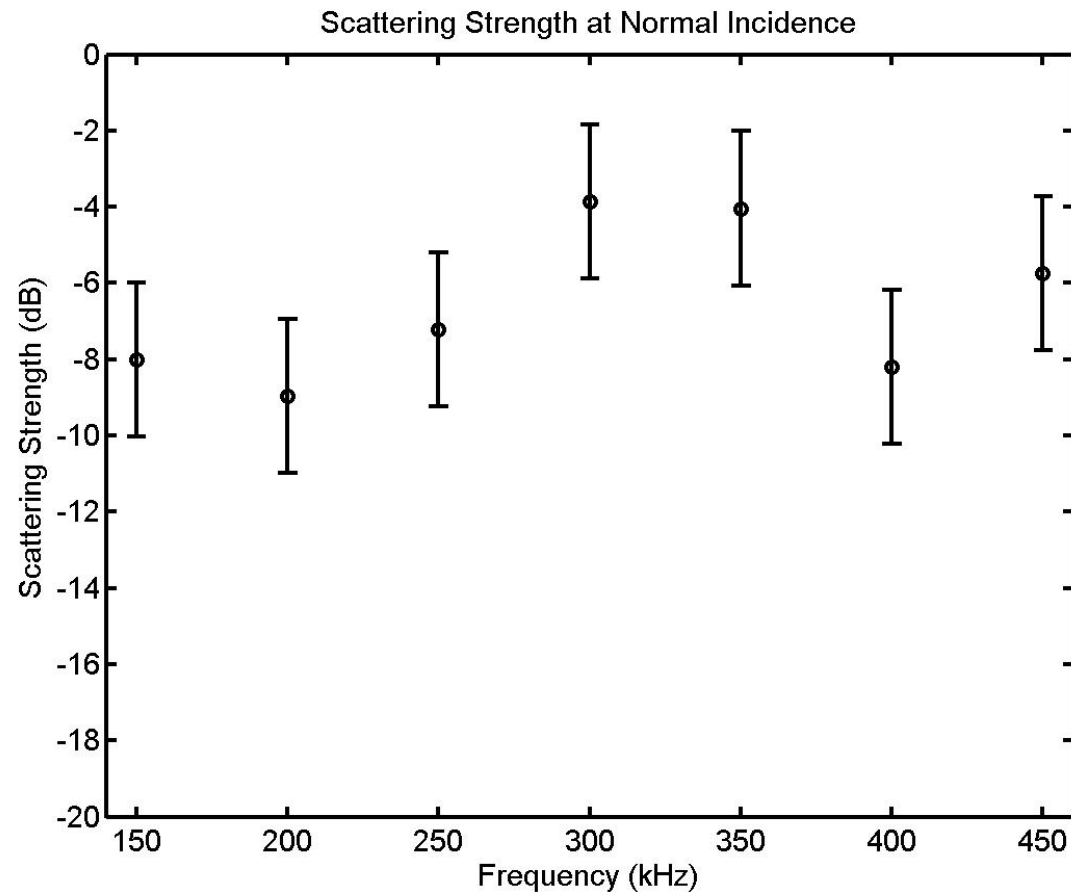


# Model to Generate Synthetic MB Intensity Time Series



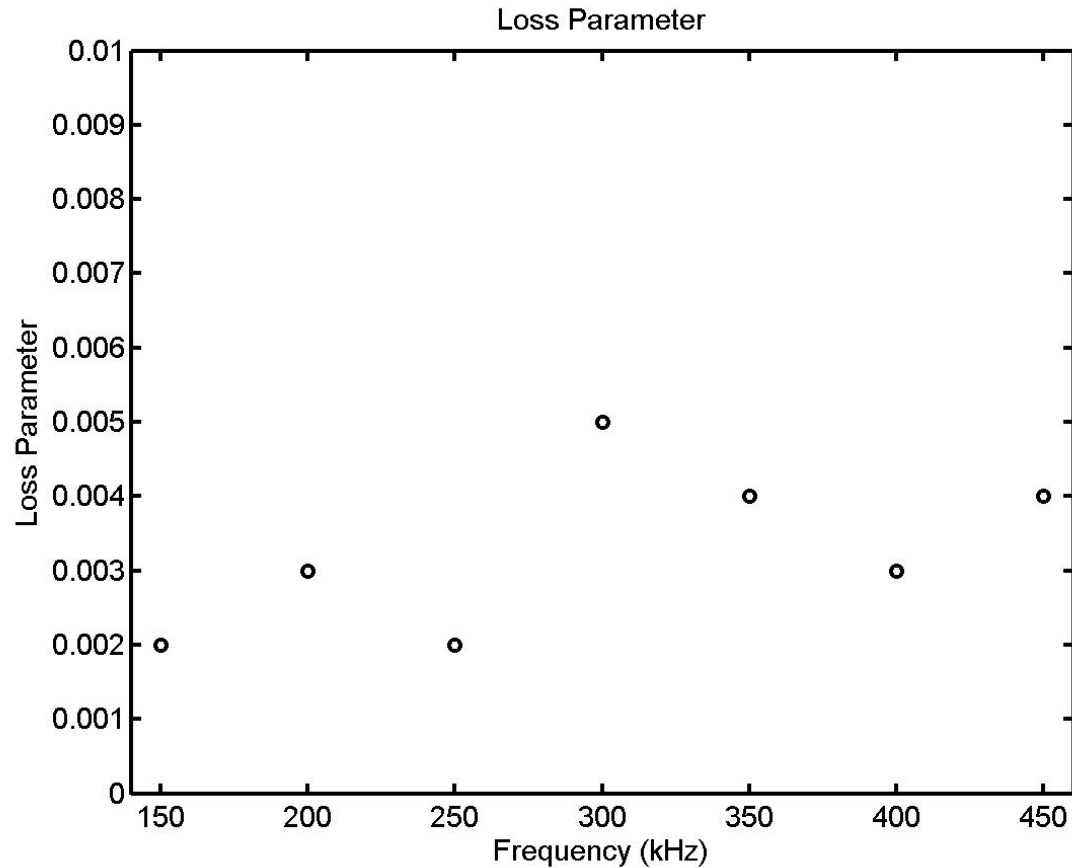
- Refraction at interface ignored
- Interface scattering grid uses same radial quantization

# Normal-Incidence Scattering Strength (Roughness + Volume)



Restricted to normal incidence owing to present lack of athwartships directivity information

# Loss (Attenuation) Parameter Vs. Frequency



- Values are smaller than “typical” 0.01
- May represent intrinsic attenuation (effect of scattering excluded)



# Concluding Remarks

- Results are preliminary, calibration not complete
- Fitting method must be improved
- Volume scattering is in multiple-scattering regime
- Comparison of inverted parameters with ground-truth is next major step